Dry Bean Weed Control Update

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4/15/2020

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Dry Bean Updates

- Cover crops for weed control?
- Ragweed is getting tougher
- Waterhemp marches north and west

Cover Crops for Weed Control?

Table 16. Reasons for cover crop use on dry bean fields in 2018.

Cover crop practice	Respondents (no.)	Respondents (%)[a]
Minnesota		
Soil conservation	28	93.3
Weed control	4	13.3
Moisture conservation	0	0
Biodiversity	1	3.3
No reason given	1	3.3
North Dakota		
Soil conservation	17	100
Weed control	1	5.9
Moisture conservation	2	11.8
Biodiversity	0	0
No reason given	0	0
Northarvest		
Soil conservation	45	95.7
Weed control	5	10.6
Moisture conservation	2	4.3
Biodiversity	1	2.1
No reason given	1	2.1

[a]Percentages do not total 100% because some respondents gave more than one reason.

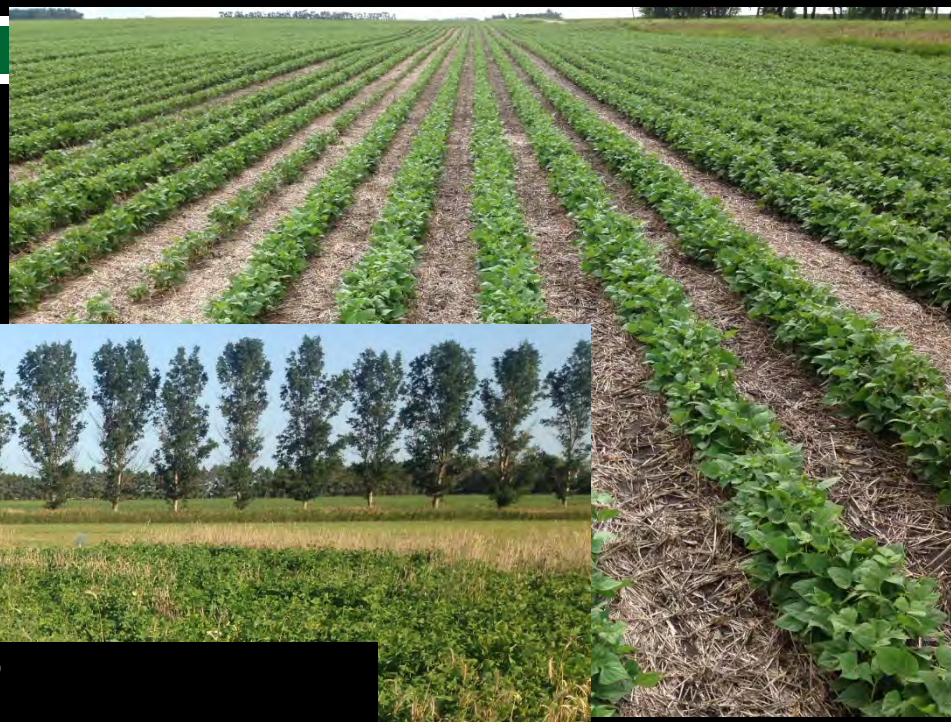
Cover Crops for Weed Control?

Table 17. Reasons for cover crop use on dry bean fields in 2019.

Cover crop practice	Respondents (no.)	Respondents (%)[a]
Minnesota		
Soil conservation	20	100
Moisture conservation	2	10
Weed control	2	10
Biodiversity	1	5
Soil tilth	1	5
North Dakota		
Soil conservation	23	92
Weed control	10	40
Moisture conservation	7	28
Reclaim nitrogen	1	4
Northarvest		
Soil conservation	43	95.6
Weed control	12	26.7
Moisture conservation	9	20
Biodiversity	1	2.2
Soil tilth	1	2.2
Reclaim nitrogen	1	2.2

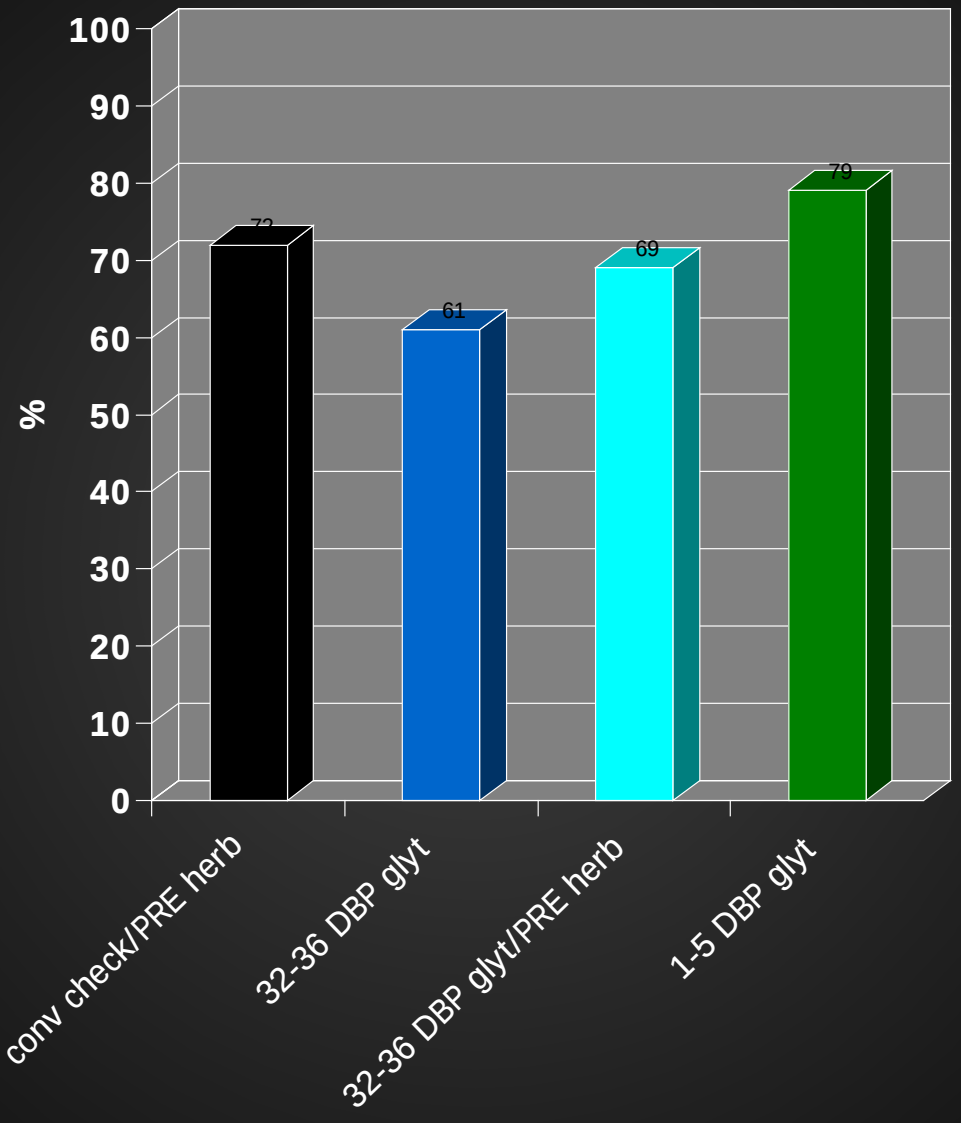
[a]Percentages do not total 100% because some respondents gave more than one reason.

WINTER RYE COVER CROP FOR PINTO BEAN



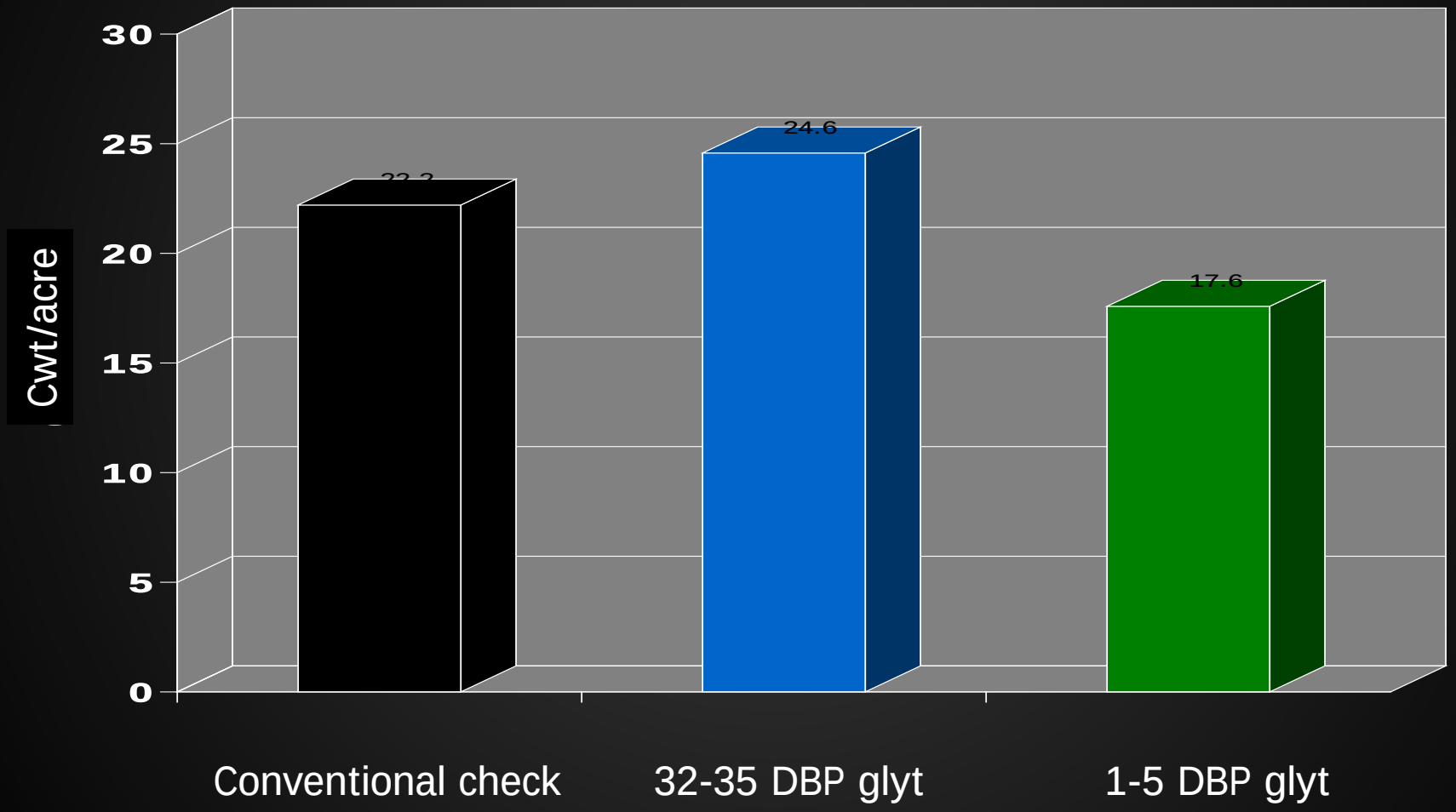
Bean yield?
Rye termination timing?
Weed suppression?

Grass weed control* in pinto bean with conventional check (no rye), and several spring termination timings of rye, Carrington, 2018-19 (2 site-years)



*Primary weeds: foxtail. Visual evaluation prior to POST herbicide application across trial for general weed control.

Pinto bean yield with conventional check, and early and late spring termination of rye, Carrington, 2017-19 (3 site-years)



Rye cover crop/Pinto bean: Weed management notes, 2017-19

- Balance live rye period for benefits (including weed suppression) vs negative impact on dry bean (moisture stress)
- Rye density
  - ✓ 'high' = increased and extended (after rye termination) weed suppression
- Rye <u>supplement</u> to soil-applied herbicide
  - ✓potentially a substitute
  - ✓timely POST herbicide app
  - ✓watch for tolerant weed species (e.g. legumes [black medic], lanceleaf sage)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Use Crop Rotation for Problem Weeds

Table 29. Frequency of previous crops (2015 - 2018) in fields planted to d

Year	2018	2017	2016	2015	4-year average
Crop	Respondents (%)	Respondents (%)	Respondents (%)	Respondents (%)	Respondents (%)
Minnesota					
Corn	54.1	29.8	48.1	40.5	43.1
Soybeans	7.1	41.7	23.5	27.8	25
Dry beans	3.5	16.7	23.5	35.4	19.8
Wheat	25.9	15.5	19.8	10.1	17.8
Sugarbeets	20	10.7	6.2	11.4	12.1
Potatoes	2.4	2.4	2.5	3.8	2.8
Barley	2.4	2.4	1.2	2.5	2.1
Field peas	0	3.6	1.2	0	1.2
Hay/grass	0	1.2	1.2	1.3	0.9
Oats	1.2	1.2	1.2	0	0.9
Alfalfa	0	0	1.2	1.3	0.6
North Dakota					
Wheat	67.3	27.7	50.3	25.2	42.6
Corn	34.6	13.5	34.9	14	24.3
Dry beans	4.3	27.7	14.8	47.6	23.6
Soybeans	1.2	34.2	12.1	28	18.9
Sugarbeets	16	11.6	2.7	7.7	9.5
Barley	4.9	3.2	4.7	2.1	3.7
Canola	0.6	7.1	1.3	0.7	2.4
Potatoes	0	1.9	3.4	1.4	1.7
Field peas	0.6	1.9	0	0	0.6
No crop	0	0	0.7	0.7	0.3
Hay/grass	0	0	0.7	0	0.2
	0	0.6	0	0	0.2
	0.6	0	0	0	0.2

Waterhemp Issues in 2019

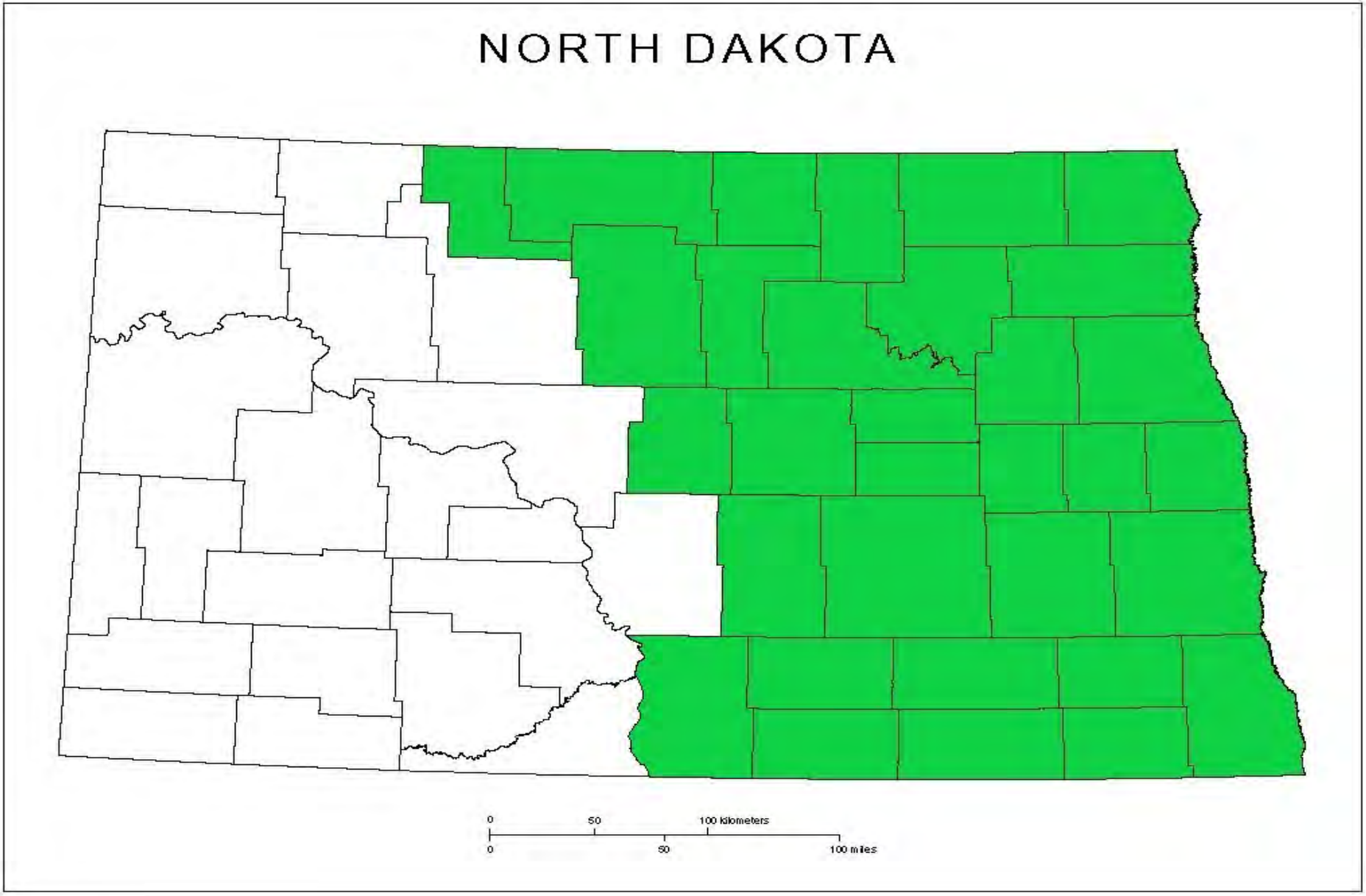
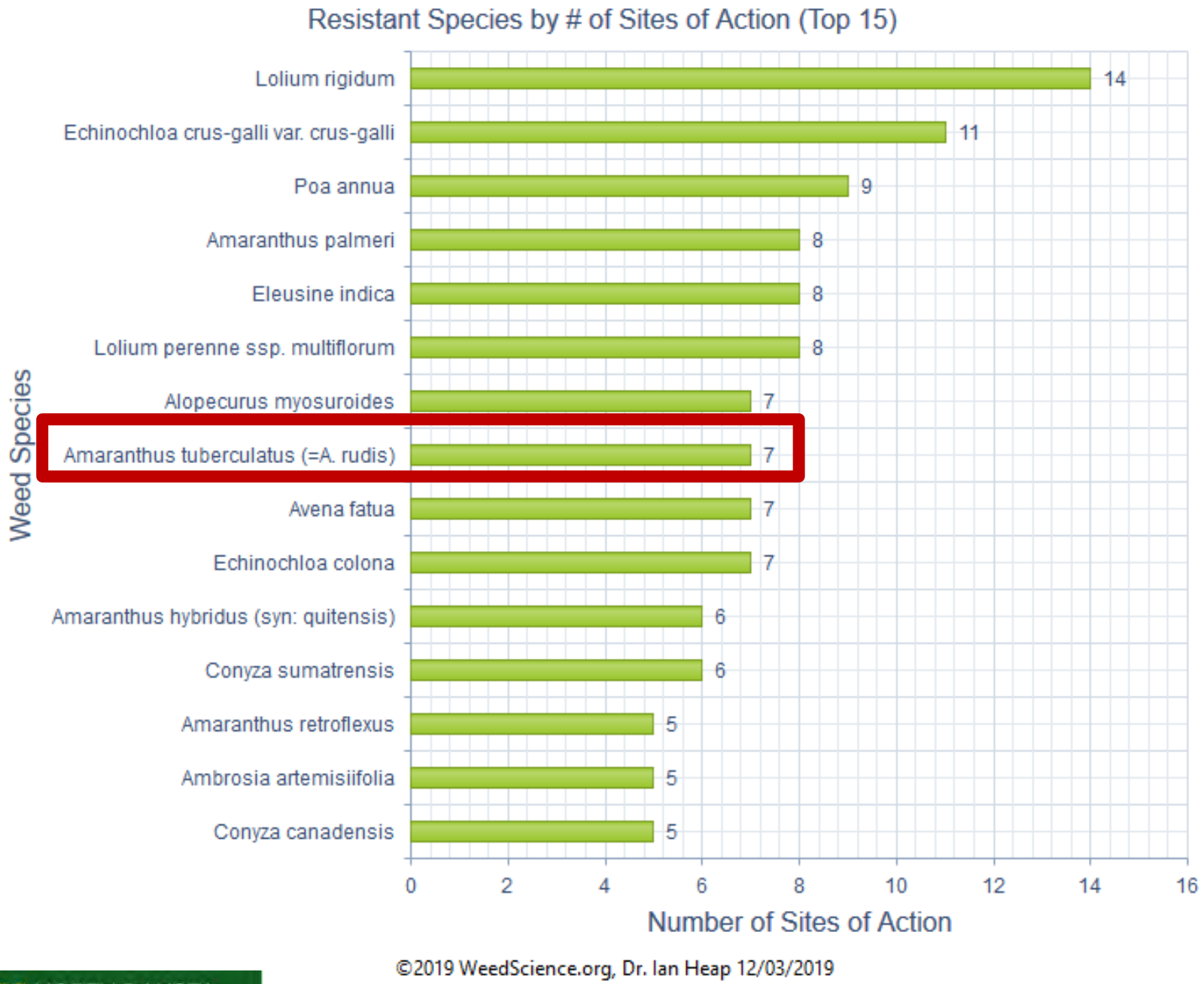


Table 39. Worst weed problem in dry beans in 2018.

Weed[a]	Respon-dents (no.)	Respon-dents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Lambsquarters	27	29	13,881	38.6
Waterhemp	30	32.3	9,049	25.1
Ragweed	16	17.2	4,279	11.9
Redroot pigweed	3	3.2	3,585	10
Nightshade	5	5.4	1,870	5.2
Sunflower	1	1.1	595	1.7
None	3	3.2	590	1.6
Foxtail	2	2.2	541	1.5
Cocklebur	1	1.1	511	1.4
Wild oat	1	1.1	375	1
Smartweed	1	1.1	373	1
Volunteer grain	2	2.2	245	0.7
Kochia	1	1.1	100	0.3
Total	**93**	**100**	**35,994**	**100**
North Dakota				
Kochia	45	31.5	29,533	34.4
Ragweed	18	12.6	12,451	14.5
Redroot pigweed	17	11.9	9,896	11.5
Lambsquarters	19	13.3	7,291	8.5
Foxtail	3	2.1	7,230	8.4
Nightshade	8	5.6	4,125	4.8
Wild mustard	4	2.8	3,382	3.9
Waterhemp	5	3.5	2,607	3
Canada thistle	5	3.5	1,520	1.8
None	2	1.4	1,276	1.5
Marestail	2	1.4	1,128	1.3
Wild buckwheat	3	2.1	1,045	1.2
Lanceleaf sage	1	0.7	1,000	1.2
Volunteer grain	2	1.4	855	1
Cocklebur	3	2.1	767	0.9
Wild oat	2	1.4	739	0.9
Biennial wormwood	2	1.4	524	0.6
Purslane	1	0.7	410	0.5
Sunflower	1	0.7	100	0.1
Total	**143**	**100**	**85,879**	**100**

Table 40. Worst weed problem in dry beans in 2019.

Weed[a]	Respon-dents (no.)	Respon-dents (%)	Acres reported (no.)[b,c]	Acres reported (%)[b,c]
Minnesota				
Lambsquarters	21	25.9	13,125	34.8
Ragweed	14	17.3	8,542	22.7
Waterhemp	30	37	8,169	21.7
Redroot pigweed	5	6.2	3,480	9.2
Nightshade	1	1.2	1,250	3.3
Canada thistle	3	3.7	1,130	3
Kochia	1	1.2	868	2.3
Foxtail	2	2.5	385	1
Wild mustard	1	1.2	370	1
Clover	1	1.2	180	0.5
Smartweed	1	1.2	89	0.2
None	1	1.2	88	0.2
Total	**81**	**100**	**37,676**	**100**
North Dakota				
Kochia	45	28.3	23,217	24
Lambsquarters	21	13.2	14,824	15.3
Ragweed	21	13.2	12,293	12.7
Foxtail	5	3.1	6,765	7
Waterhemp	8	5	6,310	6.5
Nightshade	7	4.4	6,137	6.3
Biennial wormwood	9	5.7	3,807	3.9
Prostrate pigweed	1	0.6	3,370	3.5
Cocklebur	4	2.5	2,768	2.9
Sunflowers	3	1.9	2,600	2.7
Wild oats	5	3.1	2,385	2.5
Wild mustard	5	3.1	2,204	2.3
Canada thistle	6	3.8	1,799	1.9
Wild buckwheat	5	3.1	1,561	1.6
Marestail	2	1.3	1,103	1.1
Redroot pigweed	3	1.9	1,100	1.1
Volunteer canola	2	1.3	1,100	1.1
Lanceleaf sage	1	0.6	1,000	1
Venice mallow	1	0.6	790	0.8
Black medic	1	0.6	700	0.7
None	2	1.3	694	0.7
Perennial sow thistle	1	0.6	307	0.3
nteer grain	1	0.6	75	0.1
	159	**100**	**96,909**	**100**


Resistant Species by # of Sites of Action (Top 15)
Weed Species
Lolium rigidum
Echinochloa crus-galli var. crus-galli
Poa annua
Amaranthus palmeri
Eleusine indica
Lolium perenne ssp. multiflorum
Alopecurus myosuroides
Amaranthus tuberculatus (=A. rudis)
Avena fatua
Echinochloa colona
Amaranthus hybridus (syn: quitensis)
Conyza sumatrensis
Amaranthus retroflexus
Ambrosia artemisiifolia
Conyza canadensis
14
11
9
8
8
8
7
7
7
7
6
6
5
5
5
0
2
4
6
8
10
12
14
16
Number of Sites of Action
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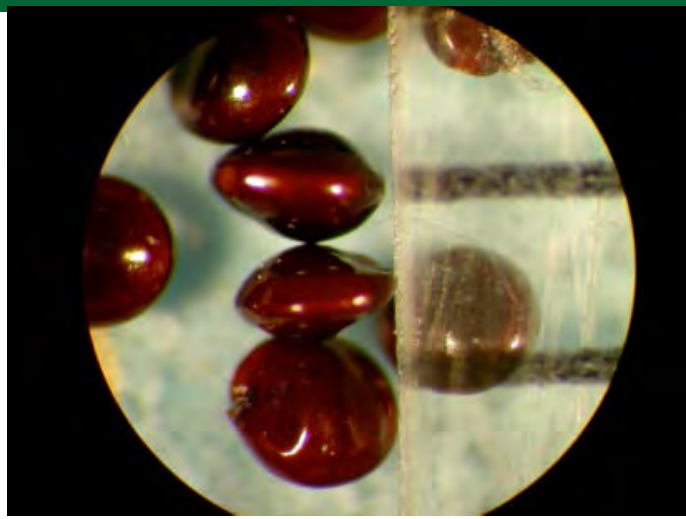
Waterhemp Biology



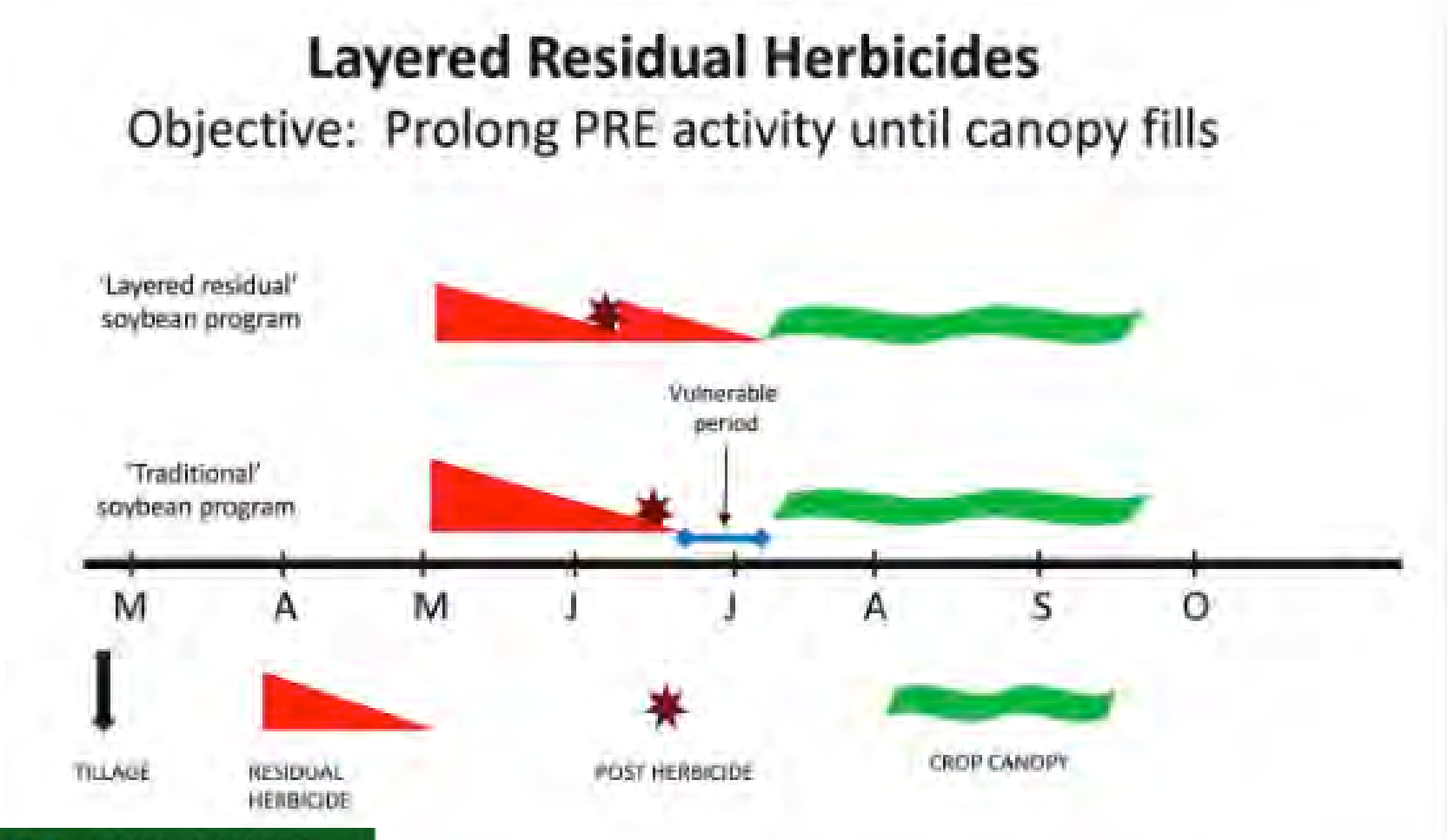
Seed:

- Prolific seed production
- Long emergence period
- Small seed size

Biology:

- Rapid growth during ideal conditions
- Dioecious reproductive: Obligate out crosser

Why should I use layered residuals for Waterhemp control in soybean?



Credit: Bob Hartzler_ISU

Waterhemp Control in Soybeans

(assuming it is glyphosate and ALS resistant but not PPO resistant)

- Start clean and use residuals at planting
  - Sulfentrazone (Authority), flumioxazin (Valor), pyroxasulfone (Zidua)
  - Metribuzin (at least 6 oz), metolachlor (Dual), acetochlor (Warrant), dimethenamid (Outlook), anything yellow
- **TIMELY** post treatments + another layer of residual
  - Flexstar/Cobra/Blazer + metolachlor, acetochlor, dimethenamid, or pyroxasulfone
  - Or
  - Liberty + metolachlor, acetochlor, dimethenamid, or pyroxasulfone in LL soybean
  - Or
  - Xtendimax/Engenia + approved group 15 in RR2Xtend soybean
  - Or
  - Enlist (tank-mix with Liberty) + approved group 15 in Enlist soybean

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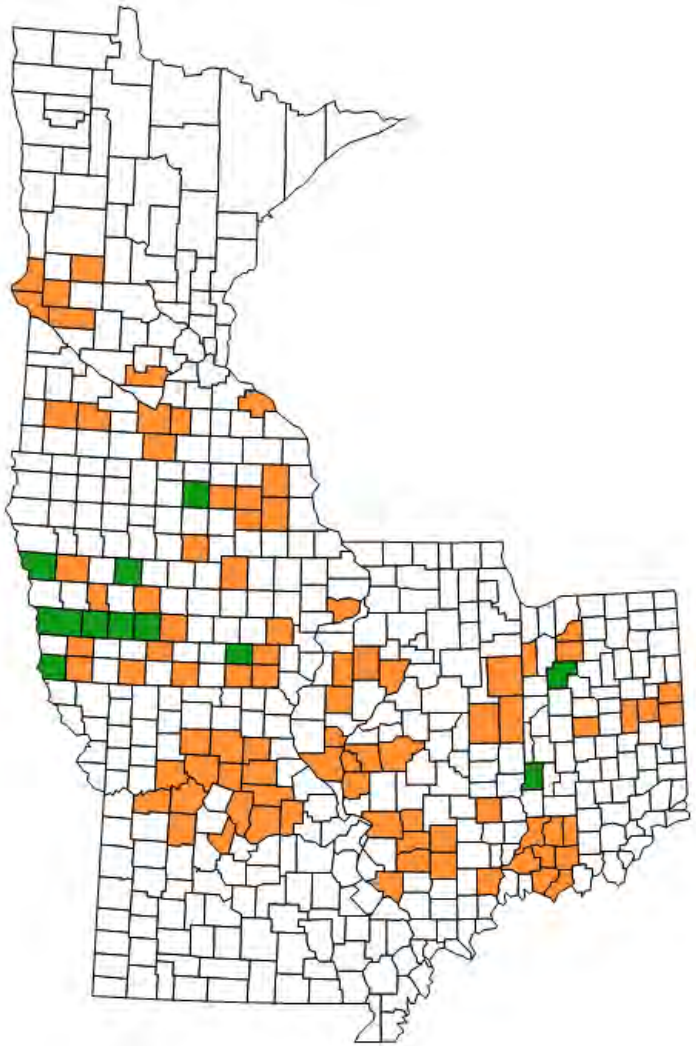
Waterhemp Control in Dry Beans

(assuming it is glyphosate and ALS resistant but not PPO resistant)

- Start clean and use residuals at planting
  - Sulfentrazone (Spartan)
  - Metolachlor (Dual), dimethenamid (Outlook), anything yellow
- **TIMELY** post treatments + another layer of residual
  - Reflex + dimethenamid (Outlook)

Waterhemp Populations with Group #14 Resistance



Resistant		
Total	Whole Plant	ΔG210
Populations (no.)		
148	126	125

- ΔG210 present
- ΔG210 absent

84%

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Waterhemp Control in Dry Beans

(assuming it is glyphosate and ALS resistant AND PPO resistant)

- Start clean and use residuals at planting
  - Sulfentrazone (Spartan)
  - Metolachlor (Dual), dimethenamid (Outlook), anything yellow
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  - ~~Reflex~~ + dimethenamid (Outlook)

Use Crop Rotation for Problem Weeds

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Sugarbeets	20	10.7	6.2	11.4	12.1
Potatoes	2.4	2.4	2.5	3.8	2.8
Barley	2.4	2.4	1.2	2.5	2.1
Field peas	0	3.6	1.2	0	1.2
Hay/grass	0	1.2	1.2	1.3	0.9
Oats	1.2	1.2	1.2	0	0.9
Alfalfa	0	0	1.2	1.3	0.6
North Dakota					
Wheat	67.3	27.7	50.3	25.2	42.6
Corn	34.6	13.5	34.9	14	24.3
Dry beans	4.3	27.7	14.8	47.6	23.6
Soybeans	1.2	34.2	12.1	28	18.9
Sugarbeets	16	11.6	2.7	7.7	9.5
Barley	4.9	3.2	4.7	2.1	3.7
Canola	0.6	7.1	1.3	0.7	2.4
Potatoes	0	1.9	3.4	1.4	1.7
Field peas	0.6	1.9	0	0	0.6
No crop	0	0	0.7	0.7	0.3
Hay/grass	0	0	0.7	0	0.2
	0	0.6	0	0	0.2
	0.6	0	0	0	0.2

How Long Do Pigweed Seed Live??

Palmer amaranth

- Soil Surface
  - 12 months – 15%
  - 24 months – 5-10%
  - 36 months – ~5%
- 6-inches deep
  - 12 months – 20%
  - 24 months – 10%
  - 36 months – 5-10%
- 4 years in a freezer
  - 91 – 95 %

Waterhemp

- Soil Surface
  - 12 months – 15%
  - 24 months – 5-10%
  - 36 months – 5%
- 6-inches deep
  - 12 months – 22%
  - 24 months – 10-15%
  - 36 months – 5%
- 4 years in a freezer
  - 91 – 94 %

When Weeds Actually Help Dry Beans!

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Questions?